Accurate
TECHNOLOGY INC.
Linear Digital Measuring Systems

Digi Scale™

User Manual for:

Digi Scale Model 10 & Model 20

and all products with a Digi (white) Digital Readout

Firmware version P1.040 & Higher

Warranty

Accurate Technology, Inc., warrants this product against defective parts and workmanship for 1 year commencing from the date of original purchase. Upon notification of a defect, Accurate Technology, Inc., shall have the option to repair or replace any defective part. Such services shall be the customer's sole and exclusive remedy. Expenses incidental to repair, maintenance, or replacement under warranty, including those for labor and material, shall be borne by Accurate Technology, Inc. (Including freight or transportation charges during the first 30 days).

Except as expressly provided in this warranty, Accurate Technology, Inc., does not make any warranties with respect to the product, either expressed or implied, including implied warranties of merchantability or fitness for a particular purpose, except as expressly provided in this agreement.

Accurate Technology, Inc., shall not be liable for any special, incidental, or consequential damages or for loss, damage or expense directly or indirectly arising from the customer's use of or inability to use the equipment either separately or in combination with other equipment, or for personal injury or loss or destruction of other property, or from any other cause.

To request repair work (either warranty qualified parts or not), contact Accurate Technology, Inc. directly by phone, fax, or e-mail. A Returned Merchandise Authorization (RMA) number is required before returning a product for repair.

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SAFETY WARNING

Before installing Digi Scale on any machinery:
Turn off the machine and disconnect the power.

SAFETY WARNING

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SECTION 1 GENERAL INFORMATION

What This Manual Includes

This manual includes information for:

Digi Scale Model 10	Part Number:	903-2006-001
Digi Scale Model 20	Part Number:	903-2060-001

About Digi Scale

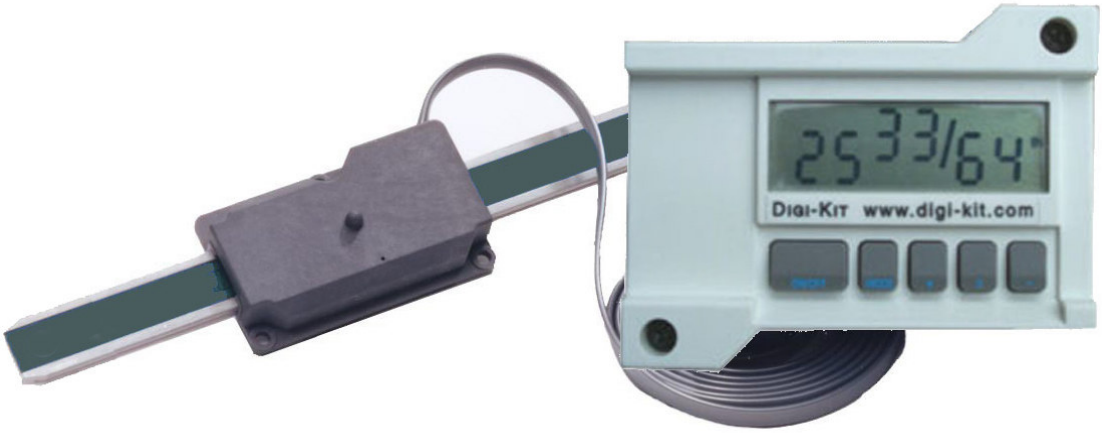
Digi Scales are a family of low cost measuring systems for applications requiring digital precision and repeatability beyond a tape measure, but without the associated cost of precision linear encoders.

While Digi Scale provides state of the art non-contact measuring at an affordable price, it is not intended for the most demanding applications requiring robust electrical noise immunity and the requirement to maintain a set position with power removed, such as high power machinery applications. It is, however, well suited for most general purpose measuring applications requiring digital precision, low cost, battery power, and reliable operation. For more demanding applications Accurate Technology ProScale™ ABS should be considered. Some differences are:

Feature	Digi Scale	ProScale ABS
Technology:	Incremental	Absolute
Measuring Range:	6 & 60 in.	10 in. to 20 ft.
Accuracy:	± .010 in.	± .002 in./ft
Repeatability:	± .010 in	± .001 in
Encoder length:	6 feet	up to 20 ft.
Programmable:	No	Yes
Data Output:	No	Yes
Power:	Battery	Battery or 24VDC
Applications:	General Purpose	General Purpose & Machinery
Warranty:	1 Year	3 Years

Digi Scale Specifications

Measuring Range:	Model 10:	6 inches (150mm)
	Model 20:	60 inches (1.5m)
Accuracy:	± .010inch	
Resolution	.01in/.1mm or .001in/.01mm or 1/16, 1/32, 1/64 inch	
Repeatability:	.01inch or .1mm	
Readout Range:	± 999.999 in; ± 99 63/64 in; ± 9999.99 mm	
Operating Temp:	32 to 120°F	
Encoder:	6 foot (2m) six-conductor cable terminated by RJ12 connector.	
Applications:	Non-Machinery, Dry environment	
Warranty:	One year from date of purchase.	



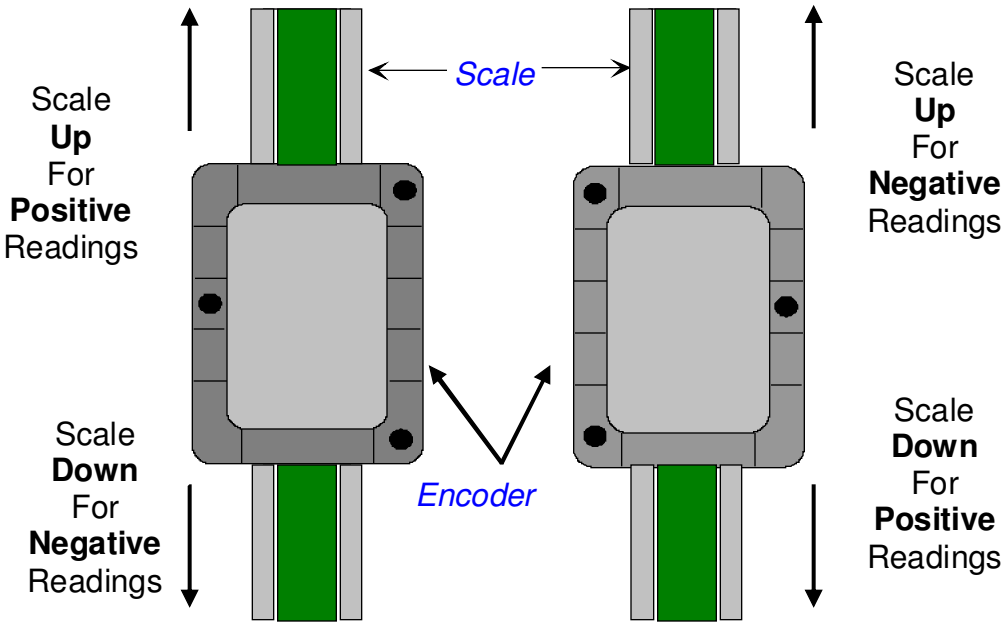
Digi Scale is easy to install. By following the installation basics in this manual, you are assured of reliable, error-free operation without any need for adjustments or modifications.

Because Digi Scale can be installed on, or used in, many types of equipment or applications, all installations are a little different. Therefore, it's the responsibility of the installer to choose bolts, screws, or other mounting hardware that guarantees proper installation.

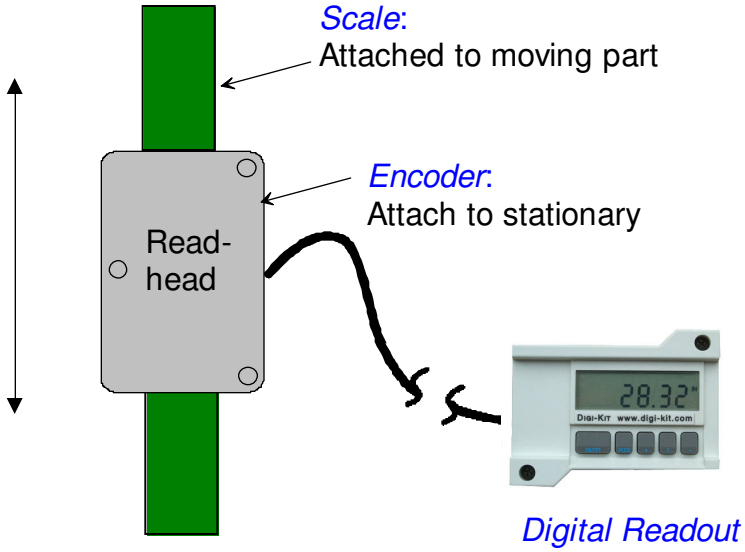
Note: *If you ordered a Digi-Kit" product that contains instructions for installation on or for a specific product, (ie Digi Fence or Digi Stop) follow those installation instructions rather than the instructions presented here.*

1. Determine appropriate mounting locations. Place the Encoder in a location that will allow the scale to be inserted into the Encoder and attached to the moving part of the target device.

2. Fasten the Encoder using three screws (or bolts) to the target device. If the surface is excessively uneven, you may need to use washers or spacers to ensure a good mount.



3. Note the orientation of the Encoder. When the side with two screw holes is on the right, moving the scale up produces positive readings and moving the scale down produces negative readings.



4. Check that the scale axis is aligned with the direction of motion of the moving part.

5. Attach the scale to the moving part of the target device. Be sure both connections are secure or inaccurate scale readings can occur.

6. Take care when sliding the scale into the Encoder so the brass “fingers” inside the Encoder do not get damaged. (A slight “wiggling” motion when installing the scale into the Encoder will simplify the process.)

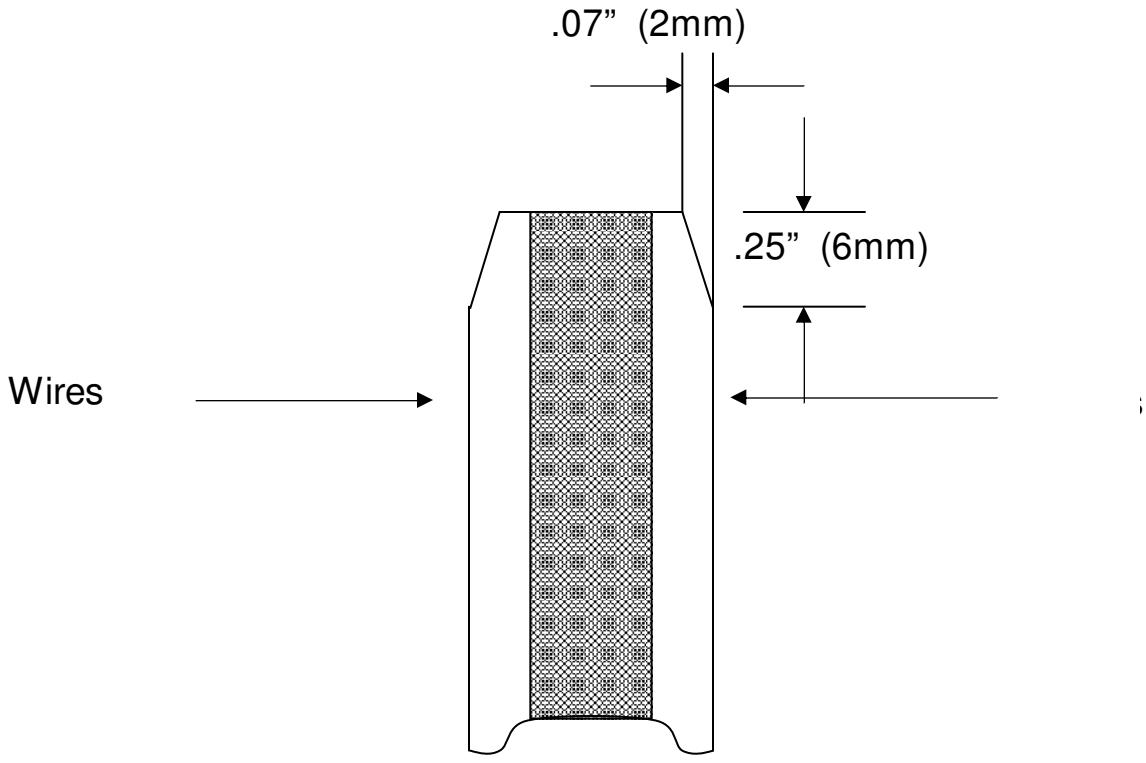
Note: If your application requires a scale of a different length, see *SHORTENING SCALES*.

Shortening Scales

To shorten Digi Scale follow these steps:

The scale has stainless-steel wires pressed into the side that could be damaged if not cut properly.

1. Clamp the wires so they do not pull away from the extrusion.
2. Using a hacksaw, cut through the aluminum extrusion.
3. Use a file or sanding tool to chamfer the cut end to approximately the specifications shown in the illustration.
4. Remove all burrs.
5. Test the shortened scale by sliding a Encoder on. There should not be any binding.



Digi Scale is easy to install. By following the installation basics in this manual, you are assured of reliable, error-free operation without any need for adjustments or modifications.

Because Digi Scale can be installed on, or used in, many types of equipment or applications, all installations are a little different. Therefore, it's the responsibility of the installer to choose bolts, screws, or other mounting hardware that guarantees proper installation.

Note: *If you ordered a Digi-Kit" product that contains instructions for installation on or for a specific product, (ie Digi Fence or Digi Stop) follow those installation instructions rather than the instructions presented here.*

1. Determine an appropriate mounting location for the Digi Scale. The scale should be mounted to a stationary part of the device. The Encoder then slides along the scale, using the supplied guide clip to transfer movement to the Encoder. The Readout should be mounted in a location which allows for easy viewing by the operator. The location of the parts should also safeguard the cable from possible damage.

2. Drill and countersink any necessary holes and mount the scale using M4 (or #8) flathead screws. It may be necessary to use washers or spacers to ensure a good mount if the scale is to be mounted on an uneven surface. Be sure the screw heads do not protrude above the surface of the extrusion. If they do, they will interfere with the Encoder.
   Check that the scale is properly aligned with the direction of motion of the moving part.

3. Referring to the figure, note these two installation requirements:
   a. For accurate measurements, the guide clip should be mounted perpendicular to the direction of travel of the Encoder.
   b. Over the full range of travel, the guide clip should exert some pressure on the Encoder so the two move as a single unit.

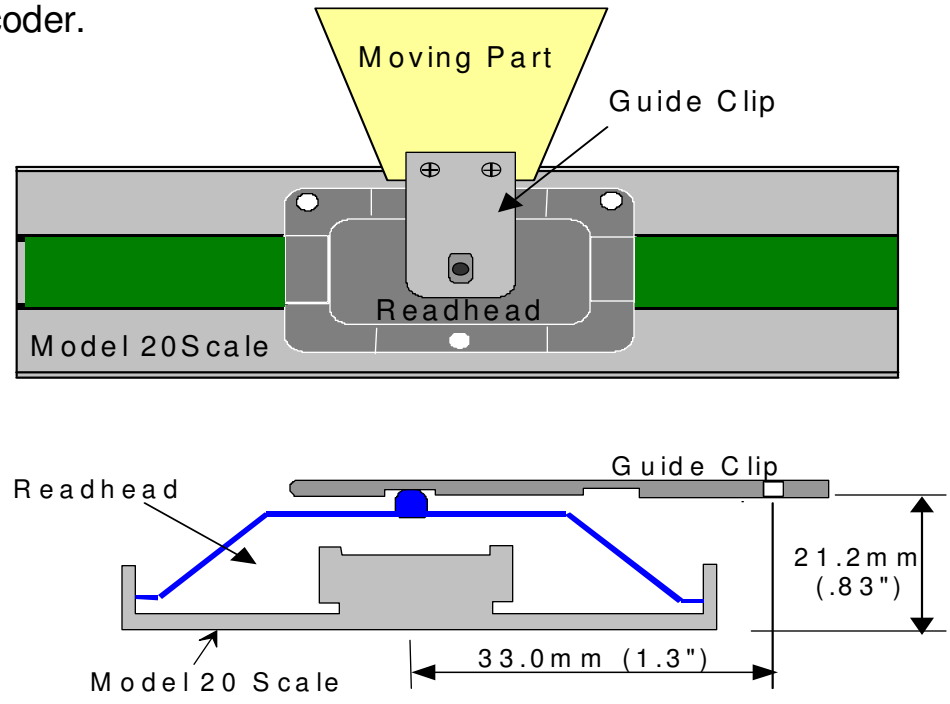
Note: Failure to use guide clip could void the warranty.

4. Reinstall the Encoder if it has been removed from the scale. Take care when sliding the Encoder onto the scale so the brass "fingers" inside the Encoder do not get damaged. (A slight "wiggling" motion when installing the Encoder on the scale will simplify the process.)

5. Slide the Encoder until it meets and engages with the guide clip. Check that the guide clip exerts sufficient pressure on the Encoder, as seen in the figure below.

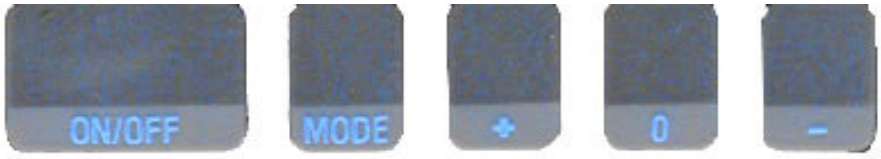
6. Place the cable in a secure position. Do not leave the cable where it could be damaged or pulled from the Encoder. Plug the Encoder into the Readout.

Note:If any other mounting method is used, observe the following:
   a. Do not drill through the green portion of the scale at any point over which the Encoder will travel.
   b. Do not mount the scale so the mounting hardware interferes with the movement of the Encoder.



Guide Clip Pressure/Spacing (End View)

Readout Keys



Timing

The keys pictured above have multiple functions. Timing, that is how long a key is depressed, and the combination of the keys pressed is important. This manual uses the term '"*momentarily*" to describe a key press of typically less than 1 second. Whereas *"press and hold*" is used imply a key press of typically longer than 1.5 seconds. As an example; when using a PC keyboard to type a capital letter you would "*press and hold*" the SHIFT key and "*momentarily* depress the LETTER key.
In addition, keep in mind the key(s) "*function*" is executed on the key RELEASE, not the key DEPRESS. This is important since some keys execute different functions based on how long they are depressed. These key operations, once tried, quickly become intuitive.

ON/OFF

Momentarily pressing the **ON/OFF** key will cause the Readout to turn on or off. The Firmware Version is displayed on power-up or when **ON/OFF** key is pressed. While on, if no key presses or positional changes occur within 15 minutes, the Digital Readout will automatically turn itself off to conserve battery life. While off, if a position change is detected (.05mm or .002in) or the **ON/OFF** button is pressed, the Readout will automatically turn itself on with no loss of measurement information.

MODE

The digital Readout can show measurement information in the customary measurement system* (Imperial) or the Metric system. To change the current display mode, momentarily press the **MODE** key. With each key press the Readout will cycle through decimal inches (.01), fractional inches (1/16), (1/32), (1/64) and metric (.1mm).

When the Readout is in 1/16 or 1/32 inch fraction mode, a series of "bars" in the upper right corner of the LCD each represent an additional 1/64th of an inch measurement. ie. When in 1/16 inch mode and three bars are showing, the measurement displayed is rounded *down* to closest 1/16 inch and each illuminated bar indicates an additional 1/64 of an inch ("heavy") measurement. For better resolution switch to 1/32 or 1/64 fraction mode. For the best resolution switch to a decimal mode.

* A measurement system that measures length in inches, feet, yards, and miles; capacity in cups, pints, quarts, and gallons; weight in ounces, pounds, and tons; and temperature in degrees Fahrenheit.

+, 0, and – Keys

The **+** (plus), **0** (zero) and **–** (minus) keys are used to change the currently displayed position to a different value. The **0** key forces the unit to display 0. Momentarily depressing the **+** key increments the current position by one unit of measurement. Momentarily depressing the **–** key decrements the current position by one unit. Pressing and holding the **+** or **–** keys will cause the displayed position to change continuously. Holding down the key will cause the amount of change to speed up. This allows for quick adjustments over a range of large values. These keys can be "locked out" using the LOCK MODE to prevent accidental offset or zero entries.

Changing Resolution

The Readout can be configured to read .001in / .01mm (high resolution) or .01in / .1mm. (normal resolution), fractions remain the same in both settings.
To change resolution you will need to remove the Readout cover. Inside, on the circuit board, you will see a series of jumpers. To display high resolution place JP2 in the A position. To display normal resolution place JP2 in the B position.

Incremental Measurements

To make Incremental measurements, press and hold MODE key for approximately 3 seconds. This switches the Readout to INCremental mode (as shown on the LCD). You can now press the ZERO, + or – keys if desired. Any measurement taken will be an incremental measurement and you will not lose your original ABSolute position. The Readout can be repeatedly re-zeroed (for repeated incremental measurements) by pressing the ZERO key. To recall + and -offsets entered while in INC mode, simply press the MODE key. (Measurement Mode changes are not allowed while in INC mode). To return to the ABS measuring mode, press the MODE key for 3 seconds.

Lock Mode

The user can "lock-out" the position offset adjustment functions **(+, -, 0** keys) to prevent accidental changes of the current displayed position. To activate the lock mode, press and hold the **ON/OFF** key and then momentarily press the **MODE** key. The measurement units (*in* or *mm*) on the LCD display will blink when the Readout is in lock mode, and the **+, -** and **0** keys will not change the displayed position.

Reverse Scaling

If you set a zero point on ProScale, moving the scale in one direction will produce positive readings. Moving the scale past zero in the opposite direction will produce negative readings. Reverse scaling means changing the orientation of the Encoder so that positive readings become negative and negative readings become positive. There are two methods to reverse readings:

1. Slide the Encoder off the scale and re-install the Encoder in the opposite direction, being careful not to damage the ground fingers inside the Encoder.
2. Change the position of jumper JP1 on the Readout circuit board.

Changing the Batteries

A **"BAT"** indicator will appear in the upper left corner of the LCD display when new batteries are needed.

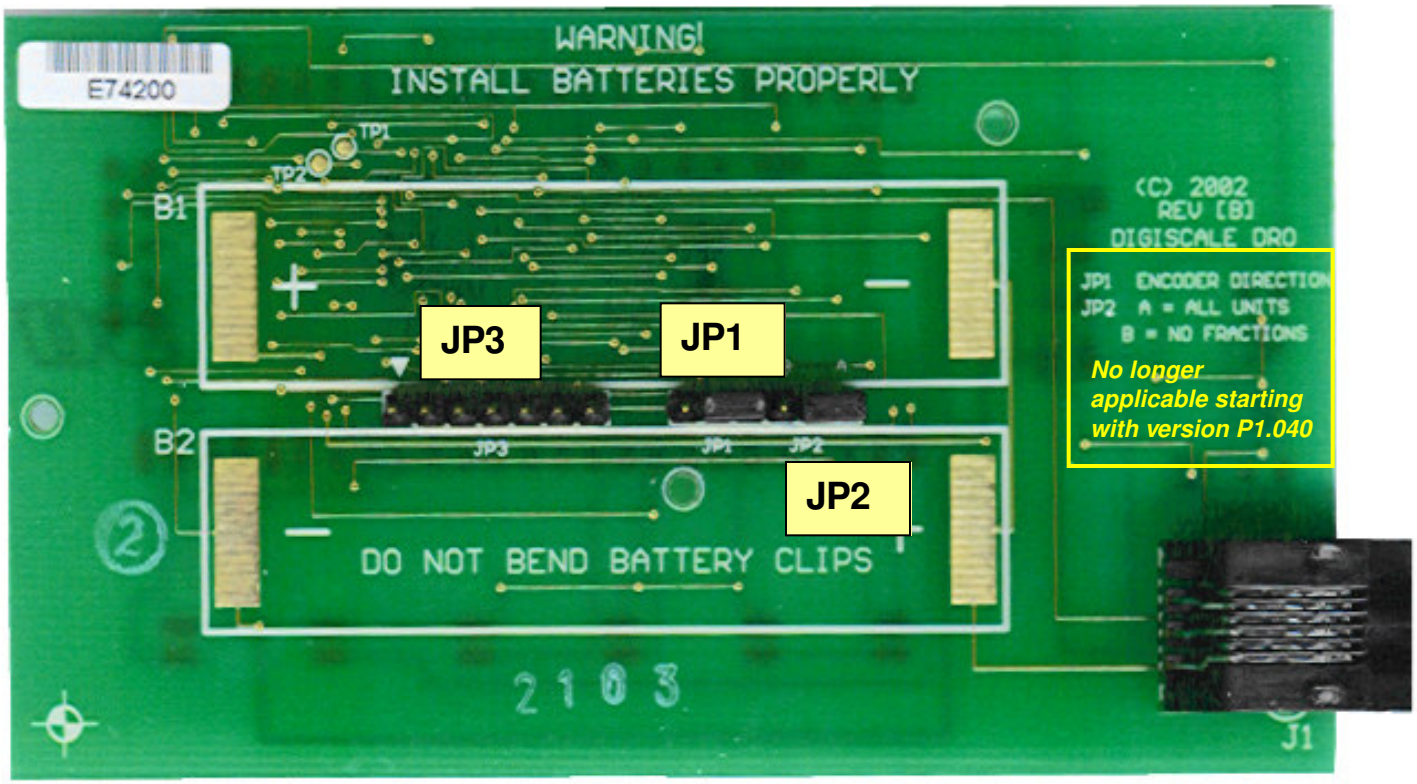
Remove the screws in the upper right and lower left corners. Pull the cover off. Remove the old batteries. Reinstall new AA Alkaline batteries, noting the proper orientation. Replace the cover and tighten the screws.

CAUTION: DO NOT BEND BATTERY CLIPS!

THESE CLIPS ARE DESIGNED TO BE LOOSE WHEN THE CASE IS OPEN AND WILL COMPRESS AND SECURE THE BATTERIES IN PLACE WHEN THE CASES ARE SCREWED TOGETHER.

Jumpers

User configurable jumpers consist of three pins and a ‘shorting block’.
The center of these pins is ‘Common’. One end pin is labeled ‘A’ and the other end pin is labeled ‘B’.



JP1 **Reverse Scaling**
Changes the direction of readings.

JP2 **Resolution**
Position A: .001in / .01mm (high resolution)
Position B: .01in / .1mm. (normal resolution)
fractions remain the same in both settings (1/16, 1/32, 164)

JP3 **FACTORY USE ONLY**

Frequently Asked Questions

What F/W (Firmware) version do I have?

The display will show *P1.xxx* on power up. This is the firmware version that your Readout uses.

What does "Err2" mean?

If the Encoder is off the scale, or the Encoder cable is unplugged from the Readout, ERR 2 will appear on the display. To clear error:

1. Be sure the Encoder is on the scale.
2. Unplug the connector from the Readout for one second and reconnect..

What does "Err4" mean?

Attempting to display measurements over 99 inches in fractions:

This digital Readout will only read up to 99 63/64 in fractions mode. You must use either the decimal or metric modes when measuring over 99 63/64 inches.

The keys don't seem to do what they are supposed to do.

Timing, that is how long a key is depressed, and the combination of the keys pressed is important. This manual uses the term '"*momentarily*" to describe a key press of typically less than 1 second. Whereas *"press and hold*" is used imply a key press of typically longer than 1.5 seconds. As an example; when using a PC keyboard to type a capital letter you would "*press and hold*" the SHIFT key and "*momentarily* depress the LETTER key.
In addition, keep in mind the key(s) "*function*" is executed on the key RELEASE, not the key DEPRESS. This is important since some keys execute different functions based on how long they are depressed.

The battery clips seem to be very loose. Is this normal?

Yes. DO NOT attempt to bend these clips or wedge anything between them and the case. These clips are designed to expand when the two case halves are screwed together.

The readings are "backwards"?

You can change the "scaling" direction of the system by:
1. Reversing the orientation of the Encoder on the Scale
2. Changing the position of Jumper JP1 on the circuit board

Thank you for choosing an Accurate Technology Product

Please register your system at
http://www.proscale.com/registration.htm

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